

Claims

[c1] 1.A computer implemented method for enabling at least one of field service of machines and training of field service personnel comprising:
generating at least one validated sequence of actions for at least one maintenance task;
validating said at least one sequence in a virtual environment; and,
delivering said at least one validated sequence for use in performing said at least one maintenance task.

[c2] 2.The method of claim 1 wherein the delivering step comprises providing natural language instructions

[c3] 3.The method of claim 2 wherein said natural language instructions comprises at least one of written instructions, voice instructions and animated exploded view video instructions.

[c4] 4.The method of claim 1 wherein the generating step imports engineering data comprising a Computer Aided Design (CAD) model.

[c5] 5.The method of claim 1 wherein the generating step comprises:
importing said engineering data;
determining mating interfaces of a plurality of component parts within a given assembly;
creating at least one component part removal path for at least one of said component parts; and,
generating said at least one sequence of instructions responsive to said creating step.

[c6] 6.The method of claim 5 further comprising repeating said generating step to generate a plurality of sequences.

[c7] 7.The method of claim 1 wherein said validating step is performed with a haptic interface.

[c8] 8.A computer implemented method for enabling at least one of field service of machines and training of field service personnel comprising:

generating at least one sequence of actions for at least one maintenance task; validating said at least one sequence can be performed by said field service personnel; and, delivering said at least one sequence for use in performing said at least one maintenance task.

- [c9] 9.The method of claim 8 wherein the validating step provides feedback to the generating step.
- [c10] 10.The method of claim 8 wherein the delivering step comprises providing written instructions.
- [c11] 11.The method of claim 8 wherein the delivering step comprises providing alternate instruction presentation such as voice instructions.
- [c12] 12.The method of claim 8 wherein the delivery step comprises providing animated exploded view video instructions.
- [c13] 13.The method of claim 8 wherein the generating step imports engineering data comprising a Computer Aided Design (CAD) model.
- [c14] 14.The method of claim 8 wherein said validating step is performed in a virtual environment.
- [c15] 15.The method of claim 8 wherein said validating step is performed with a haptics interface.
- [c16] 16.The method of claim 8 wherein the generating step comprises:
 - importing engineering data from a Computer Aided Design (CAD) model;
 - determining mating interfaces of a plurality of component parts within said CAD model;
 - creating at least one component part removal path for at least one of said component parts in a given exploded view; and,
 - generating said at least one sequence of instructions responsive to said creating step.
- [c17] 17.The method of claim 16 further comprising repeating said generating step to

generate a plurality of sequences.

[c18] 18. A system for enabling at least one of field service of machines and training of field service personnel comprising:
an engineering data generating device adapted to compute and provide engineering data relating to said machines;
a service sequence generator adapted to import and process said engineering data to generate at least one sequence of instructions for at least one maintenance task;
an automated generating device adapted to convert said at least one sequence of instructions into natural language instructions for use in said at least one maintenance task;
a validating device adapted to verify said natural language instructions; and,
a delivery device adapted to deliver said natural language instructions to said field service personnel.

[c19] 19. The system of claim 18 wherein said engineering data generating device is a Computer Aided Design (CAD) system and said engineering data comprises at least one of CAD models and engineering drawings.

[c20] 20. The system of claim 18 wherein said automated generating device produces human-readable instructions for said maintenance tasks.

[c21] 21. The system of claim 18 wherein said human-readable instructions comprise at least one of written instructions, voice instructions and animated exploded view video instructions.

[c22] 22. The system of claim 18 wherein said validating device comprises a haptics device.

[c23] 23. The system of claim 18 wherein said service sequence generator is further adapted to generate a plurality of collision-free part removal paths for said at least one sequence of instructions.

[c24] 24. The system of claim 18 wherein said delivery device is further adapted to permit said service personnel to select a desired format for said instructions.

[c25] 25.The system of claim 24 wherein said format comprise at least one of written instructions, voice instructions and animated exploded view video instructions.